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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/887,606	06/22/2001	Frank A. Scarpino	TRD 021 IA	7244
29673	7590	07/28/2005	EXAMINER	
STEVENS & SHOWALTER LLP 7019 CORPORATE WAY DAYTON, OH 45459-4238			MICHALSKI, JUSTIN I	
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			2644	

DATE MAILED: 07/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/887,606	Applicant(s) SCARPINO ET AL.	
	Examiner Justin Michalski	Art Unit 2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 June 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claim 1, lines 10-14, contains the limitation, "the enhanced audio signal is recognizable as being the input audio signal enhanced such that audible sound reproduced from the enhanced audio signal exhibits a perceptively improved harmonic quality and sound source separation compared to the audible sound reproduced from the undistorted input audio signal." The claim does not convey in express terms how the "enhanced audio signal" is to be "recognizable". The instant specification does not provide guidance, such as identifying values obtained by objective measurements on the "enhanced audio signal", for determining whether it is "recognizable" as the input audio signal "enhanced." Further, regarding the term "perceptively improved", there is no guidance in the instant specification as to how one may ascertain whether or not the harmonic quality and sound source separation is "perceptively improved."

Since independent claims 3, 4, 7, 10, and 13 also include a limitation similar that above the office is unable to ascertain the metes and bounds of the claims that use terms "recognizable" and "perceptively improved".

Dependent claims 2, 5, 6, 7, 8, 11, 12, and 14-18 are also subject to this grounds of rejection.

3. Claims 8 and 9 are further rejected under U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 8 and 9, dependent on claim 4, add method limitations which are inconsistent with the apparatus limitations of claim 4.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 1-3, and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Op de Beek et al. (Hereinafter "Beek") (US Patent 4,845,758).

Regarding Claim 1, Beek discloses frequency response (Fig. 12) for enhancing the quality of an input audio signal made up of a plurality of signal components, each signal component having an amplitude and a frequency, and the frequencies of the input audio signal being within a band of frequencies having a low end and a high end (horizontal axis of Fig. 12), at least a portion of which being within the range of normal human hearing (frequencies of Fig. 12 are within the normal human range of hearing of 20Hz to 20kHz), said frequency response comprising a curve with a shape, wherein the

input audio signal becomes an enhanced audio signal when distorted in accordance with the shape of said curve, the input audio signal is distorted in accordance with the shape of said curve when signal components having frequencies between a reference frequency (f_2 or f_4 can be reference frequency) and the high end (f_5) increase in amplitude as per increasing frequencies from the reference frequency toward the high end, over at least a portion of the band of frequencies, and the enhanced audio signal is recognizable as being the input audio signal enhanced such that audible sound reproduced from the enhanced audio signal exhibits a perceptively improved harmonic quality and sound source separation compared to audible sound reproduced from the undistorted input audio signal.

Regarding Claim 2, Beek further discloses the input audio signal is distorted in accordance with the shape of said curve (Fig. 12 discloses transfer function) when signal components having frequencies between the reference frequency and the high end increase in amplitude up to a significant amplitude peak and there is up to a total of only three significant amplitude peaks between the low end and the high end (Fig. 12 discloses three peaks at f_1 , f_3 , and f_5).

Regarding Claim 3, Beek discloses apparatus (Fig. 11) for enhancing the quality of an input audio signal (87) made up of a plurality of signal components, each signal component having an amplitude and a frequency, and the frequencies of the input audio signal being within a band of frequencies having a low end and a high end, at least a

portion of which being within the range of normal human hearing, said apparatus being operatively adapted for distorting (Fig. 12) the input audio signal according to a frequency response curve such that when the input audio signal is transmitted through said apparatus, said input audio signal is distorted into an enhanced audio signal such that signal components having frequencies between a reference frequency (f_2 or f_3) and the high end increase in amplitude as per increasing frequencies from the reference frequency toward the high end (f_5), over at least a portion of the band of frequencies, wherein said frequency response curve does not vary according to the amplitude of the input audio signal, and the enhanced audio signal is recognizable as being the input audio signal enhanced such that audible sound reproduced from the enhanced audio signal exhibits a perceptively improved harmonic quality and sound source separation compared to audible sound reproduced from the input audio signal (Fig. 12).

Regarding Claim 7, Beek discloses a method of enhancing the quality of an audio signal, comprising: providing an input audio (Fig. 11, input 87) signal made up of a plurality of signal components, each signal component having an amplitude and a frequency, and the frequencies of the input audio signal being within a band of frequencies having a low end and a high end (horizontal axis of Fig. 12), at least a portion of which being within the range of normal human hearing; and distorting the input audio signal into an enhanced audio signal such that signal components having frequencies between a reference frequency and the high end increase in amplitude as per increasing frequencies from the reference frequency (f_2 or f_4 can be reference

frequency) toward the high end (f_5), over at least a portion of the band of frequencies, such that the enhanced audio signal is recognizable as being the input audio signal enhanced such that audible sound reproduced from the enhanced audio signal exhibits a perceptively improved harmonic quality and sound source separation compared to audible sound reproduced from the undistorted input audio signal; wherein the enhanced audio signal is not normalized to a flat frequency response (Fig 12 is not a flat response).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beek as applied above in view of Mirfakhraei (US Patent 6,512,789).

Regarding Claim 4, Beek discloses an apparatus (Fig. 11) for enhancing the quality of an input audio signal (87) made up of a plurality of signal components, each signal component having an amplitude and a frequency, and the frequencies of the input audio signal being within a band of frequencies having a low end and a high end, at least a portion of which being in the range of normal human hearing, said apparatus being operatively adapted for distorting (Fig. 12) the input audio signal, when transmitted therethrough, into an enhanced audio signal such that signal components

having frequencies between a reference frequency and the high end increase in amplitude as per increasing frequencies from the reference frequency (f_2 or f_3) toward the high end (f_5), over at least a portion of the band of frequencies, wherein the enhanced audio signal is recognizable as being an enhanced version of the input audio signal, and said apparatus enhances the input audio signal such that audible sound reproduced from the enhanced audio signal exhibits a perceptively improved harmonic quality and sound source separation compared to audible sound reproduced from the undistorted input audio signal. Beek does not disclose stretching the tone in the time domain long enough to be heard but not so long as to be blurred. Mirfakhraei discloses the impulse response stretched out but reduced to correct for distortion across the broadband channel, i.e. not long enough to be blurred (Paragraph bridging columns 1 and 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to stretching the tone in the time domain long enough to be heard but not so long as to be blurred in order to correct for distortion as taught by Mirfakhraei.

Regarding Claim 5, Mirfakhraei further discloses the impulse response stretches over several samples (Col. 2, lines 1-2). Note, the term "at least about" as claimed is broad and not defined in the specification.

Regarding Claim 6, Beek further discloses an amplitude shaping function (Transfer function Fig. 12).

8. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beek as applied above in view of Herre et al. (Hereinafter "Herre") (US Patent 5,812,672).

Regarding Claim 10, Beek discloses a method of enhancing the quality of an audio signal, comprising: providing an input audio signal (Fig. 11, signal 87) made up of a plurality of signal components, each signal component having an amplitude and a frequency, and the frequencies of the input audio signal being within a band of frequencies having a low end and a high end, at least a portion of which being within the range of normal human hearing; distorting the input audio signal into an enhanced audio signal such that signal components having frequencies between a reference frequency (Fig. 12, f_2 or f_3) and the high end increase in amplitude as per increasing frequencies from the reference frequency toward the high end (f_5), over at least a portion of the band of frequencies, such that the enhanced audio signal is recognizable as being the input audio signal enhanced such that audible sound reproduced from the enhanced audio signal exhibits a perceptively improved harmonic quality and sound source separation compared to audible sound reproduced from the undistorted input audio signal. Beek does not disclose compressing the enhanced audio signal. Herre discloses compressing a left and right audio signal in order to reduce the amount of data that has to be transmitted (Col. 1, lines 8-15; Col. 4, lines 22-26). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to compress the audio signal in order to reduce the amount of data that has to be transmitted resulting in greater efficiency.

Regarding Claims 11 and 12, Beek further discloses the signal compressed before transmitted to a location and converted into a sound (Figs. 1a and 1b).

9. Claims 13-18 are is rejected under 35 U.S.C. 103(a) as being unpatentable over Beek as applied above in view of Dibachi et al (Hereinafter "Dibachi") (US Patent 6,173,062).

Regarding Claims 13, 17, and 18, Beek discloses A method of enhancing the quality of an audio signal, comprising: providing an input audio signal made up of a plurality of signal components (Fig. 12, signal 87), each signal component having an amplitude and a frequency, and the frequencies of the input audio signal being within a band of frequencies having a low end and a high end, at least a portion of which being within the range of normal human hearing; distorting the input audio signal (Fig. 12) into an enhanced audio signal, according to a frequency response curve having a width, such that signal components having frequencies between a reference frequency and the high end increase in amplitude as per increasing frequencies from the reference frequency (f_2 or f_3) toward the high end, over at least a portion of the band of frequencies, such that the enhanced audio signal is recognizable as being the input audio signal enhanced such that audible sound reproduced from the enhanced audio signal exhibits a perceptively improved harmonic quality and sound source separation compared to audible sound reproduced from the undistorted input audio signal; processing the input audio signal through an audio system having a bandwidth. Beek does not disclose reducing the width of the frequency response curve so as to fit at

least mostly within the bandwidth of the audio system. Dibachi discloses a method for enhancing the quality of an audio signal including contracting the bandwidth of the transfer function to maintain the bandwidth of the original signal. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to reduce the width of the frequency response curve to filter the audio signal without cutting off part of the frequency response for a completely enhance audio signal.

Regarding Claim 14, Beek further discloses the audio signal (87 to 85) is processed through the audio system before being distorted.

Regarding Claim 15, Beek further discloses the input audio signal is distorted (87 to 1) into an enhanced audio signal before being processed through the audio system (82 to 83).

Regarding Claim 16, Beek further discloses three peaks at Fig. 12, f_1 , f_3 , and f_5 .

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin Michalski whose telephone number is (571)272-7524. The examiner can normally be reached on M-F 7-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571)272-7848. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2644

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JIM


July 21, 2005


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